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### **High- $\beta$ , Weakly Magnetized and Hall Dominated Plasma Couette Flow<sup>1</sup>**

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A novel plasma equilibrium in the high- $\beta$ , Hall regime that produces centrally-peaked, high Mach number Couette flow is described. Flow is driven using a weak, uniform magnetic field (0-10 G) and large, cross field currents (100-300 A). Large magnetic field amplification (factor 20) due to the Hall effect is observed when electrons are flowing radially inward, and near perfect field expulsion is observed when the current is reversed. In the reversed direction, flow is weak and driven from the outer edge, creating a solid-body profile. However, a high- $\beta$  extension of the gradient drift instability is observed, driven by large toroidal Hall currents. High-resolution spectroscopy shows evidence of Landau damping of this electromagnetic wave and heating of cold ions ( $T_i \sim 0.5$  eV heated to  $T_i \sim 1.5$  eV). Co-authors: J. Milhone, J. Egedal, D. Endrizzi, J. Olson, University of Wisconsin-Madison, E.E. Peterson, Massachusetts Institute of Technology, R. Sassella, C.B. Forest, University of Wisconsin-Madison

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